

Draft Technical Memorandum



To: Kevin Jeffers, PE Date: October 08, 2010
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Nisqually Junction to South Tacoma, Washington
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Subject: Existing (September 2010) Traffic Volumes Summary

1. Introduction

This technical memo documents the existing peak hour traffic volumes collected during the last two weeks of September 2010 at four areas (ramp terminal and nearby intersections) on I-5 within the overall Point Defiance Bypass study area. The four areas include (1) Berkeley Street, (2) Thorne Lane, (3) 41st Division Drive, and (4) Barksdale Avenue. All intersections/ramp terminals counted are labeled with circles as shown in **Figure 1**.

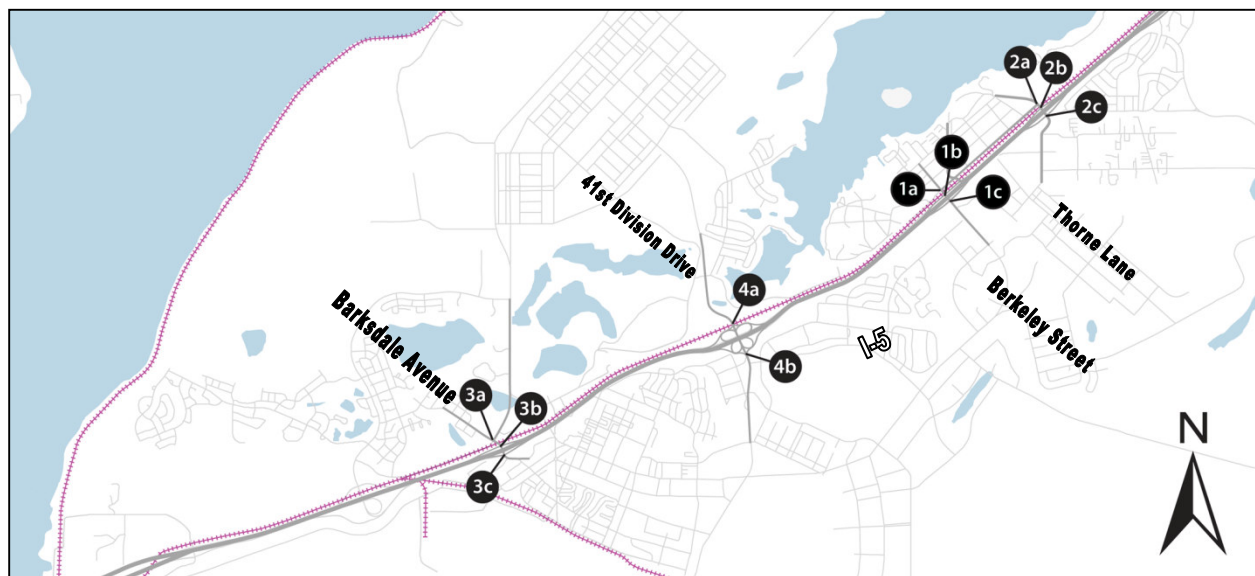


Figure 1 Study Area Location Map

The purpose of this memo is to summarize the latest traffic volume information and compare them with previous traffic counts. The desired outcome is to have WSDOT concur with the recommended peak hours and volume sets for modeling existing traffic conditions for the operational analysis.

Throughout the text in the document, **bolded and underlined items** are requests for WSDOT to concur with the actions or assumptions. These requests offer recommendations for and seek WSDOT's concurrence on the time periods (and thus the traffic volumes) to be used for the simulation modeling. WSDOT's responses will direct the way in which future simulations are developed.

2. Methodologies

2.1. Data Collection

Data Collection Units with video cameras were used to collect intersection turning movement counts and majority peak hour queue lengths for this study. For each area/crossing, the traffic counts and queue lengths were collected on the same day. The data collection time periods for each day were:

- ☐ AM Peak Period (5:00-9:00) 4 hours. This period has been further broken-down into the “Early AM” peak from 5:00-7:00 and the “Regular AM” peak from 7:00-9:00. The extended data collection period was developed to account for the early-start of many personnel at the military bases.
- ☐ Lunch/NN Peak Period (11:00-13:00) 2 hours.
- ☐ PM Peak Period (16:00-18:00) 2 hours. These times were selected based on initial reconnaissance which identified that the combination of personnel exiting the military bases and regular afternoon traffic represented the worst congestion conditions at the affected intersections.

Manual queue length observations were made at the locations where cameras are not allowed, such as at the entrances/exits of the military bases. Manual queue length observations covered 2 hours in AM peak period and 1 hour for both lunch and PM peak periods.

Appendix A presents the Data Collection Plan that was used to communicate and coordinate with the military bases for this data collection effort. **Appendix B** presents intersection geometry of the individual intersections in the study area.

2.2. Data Processing

Intersection turning movement counts have been summarized in the format of “one sheet per intersection per period”. Two-class (Passenger Car and Truck) traffic volumes have been aggregated into 15-minute intervals. Pedestrian and bike counts have also been summarized into individual sheets.

Intersecting streets/roadways were analyzed together to identify the “system” peak hour. The peak hour volumes for these intersections were balanced and will be used for the upcoming simulations. The balancing process employed the higher values of the unbalanced counts and the higher values were used to make proportional changes to balance the peak hour traffic volumes.

Queue lengths were aggregated into 2-minutes intervals, since these lengths can vary significantly and, during the simulation process, these results will be correlated with signal operations. The memo does not include these queue length summaries. The raw queue length collection sheets and videos will be provided when existing condition simulation models are refined.

3. Balanced Traffic Volumes (2010 September)

Appendix C presents 2010 September balanced and unbalanced hourly traffic volumes for intersections and ramp terminals along Berkeley Street, Thorne Lane, 41st Division Drive, and Barksdale Avenue.

Appendix D presents 15-minute traffic volumes for individual intersections extracted from traffic videos in the field.

For comparison purposes, **Appendix E** presents 2006 traffic volumes summary including both unbalanced and balanced traffic volumes. In 2006, no traffic data was collected for the Midday/Lunch peak period at the intersections/ramp terminals along 41st Division Drive and Barksdale Avenue.

4. Traffic Volume Comparison with Previous Studies

Several previous traffic studies have been conducted in the project area and include the following traffic counts:

- (1) 2006 Traffic Counts for Point Defiance Bypass Study -Early AM, Regular AM, Lunch/NN, and PM
- (2) 2009 April Traffic Counts for Camp Murray Gate Relocation Traffic Analysis -PM Peak Counts
- (3) 2009 June Traffic Counts for I-5/Lakewood Transportation Study (I-5 Transportation Alternatives Analysis and Operational Traffic Model) -PM Peak Counts

Table 1 through **Table 4** provides comparisons of the latest peak hour volumes at each intersection with previous studies for each intersection in the study area during different peak hours.

Table 1 Intersection Total Traffic Volume Comparison- Early AM Peak Hour (Unit: Vehicle/Hour)

No.	Intersection/Ramp Terminals	2010 Point Defiance Bypass – Traffic Study Update (2010.09)	2006-07 Point Defiance Bypass Study (2006)	Camp Murray Gate Relocation Traffic Analysis (2009.04)	I-5/Lakewood Transportation Study (2009.06)
1	Berkeley Street and Union Avenue	472	324	N/A	N/A
2	Berkeley Street and SB I-5 Ramps	1339	1297	N/A	N/A
3	Berkeley Street and NB I-5 Ramps	1913	1759	N/A	N/A
4	Thorne Lane and Union Avenue	478	230	N/A	N/A
5	Thorne Lane and SB I-5 Ramps	1256	820	N/A	N/A
6	Thorne Lane and NB I-5 Ramps	1066	1027	N/A	N/A
7	Barksdale Avenue and Steilacoom	1177	972	N/A	N/A
8	Barksdale Avenue and SB I-5 Ramps	1420	1052	N/A	N/A
9	Barksdale Avenue and NB I-5 Ramps	2412	1198	N/A	N/A
10	41st Division Drive at I-5 SB Ramps	2820	1860	N/A	N/A
11	41st Division Drive at I-5 NB Ramps	2998	1991	N/A	N/A

Table 2 Intersection Total Traffic Volume Comparison- Regular AM Peak Hour (Unit: Vehicle/Hour)

No.	Intersection/Ramp Terminals	2010 Point Defiance Bypass – Traffic Study Update (2010.09)	2006-07 Point Defiance Bypass Study (2006)	Camp Murray Gate Relocation Traffic Analysis (2009.04)	I-5/Lakewood Transportation Study (2009.06)
1	Berkeley Street and Union Avenue	876	650	N/A	N/A
2	Berkeley Street and SB I-5 Ramps	1573	1265	N/A	N/A
3	Berkeley Street and NB I-5 Ramps	2205	1821	N/A	N/A
4	Thorne Lane and Union Avenue	497	316	N/A	N/A
5	Thorne Lane and SB I-5 Ramps	1191	919	N/A	N/A
6	Thorne Lane and NB I-5 Ramps	1404	1089	N/A	N/A
7	Barksdale Avenue and Steilacoom	1519	1346	N/A	N/A
8	Barksdale Avenue and SB I-5 Ramps	1600	1361	N/A	N/A
9	Barksdale Avenue and NB I-5 Ramps	1679	1222	N/A	N/A
10	41st Division Drive at I-5 SB Ramps	2585	1456	N/A	N/A
11	41st Division Drive at I-5 NB Ramps	2848	1522	N/A	N/A

Table 3 Intersection Total Traffic Volume Comparison- Lunch/NN Peak Hour (Unit: Vehicle/Hour)

No.	Intersection/Ramp Terminals	2010 Point Defiance Bypass – Traffic Study Update (2010.09)	2006-07 Point Defiance Bypass Study (2006)	Camp Murray Gate Relocation Traffic Analysis (2009.04)	I-5/Lakewood Transportation Study (2009.06)
1	Berkeley Street and Union Avenue	1233	1085	N/A	N/A
2	Berkeley Street and SB I-5 Ramps	1545	1396	N/A	N/A
3	Berkeley Street and NB I-5 Ramps	2132	1745	N/A	N/A
4	Thorne Lane and Union Avenue	799	635	N/A	N/A
5	Thorne Lane and SB I-5 Ramps	1274	1031	N/A	N/A
6	Thorne Lane and NB I-5 Ramps	1411	1231	N/A	N/A
7	Barksdale Avenue and Steilacoom	1258	N/A	N/A	N/A
8	Barksdale Avenue and SB I-5 Ramps	1566	N/A	N/A	N/A
9	Barksdale Avenue and NB I-5 Ramps	1530	N/A	N/A	N/A
10	41st Division Drive at I-5 SB Ramps	2636	N/A	N/A	N/A
11	41st Division Drive at I-5 NB Ramps	3010	N/A	N/A	N/A

Table 4 Intersection Total Traffic Volume Comparison- PM Peak Hour (Unit: Vehicle/Hour)

No.	Intersection/Ramp Terminals	2010 Point Defiance Bypass – Traffic Study Update (2010.09)	2006-07 Point Defiance Bypass Study (2006)	Camp Murray Gate Relocation Traffic Analysis (2009.04)	I-5/Lakewood Transportation Study (2009.06)
1	Berkeley Street and Union Avenue	1157	895	1165	1110
2	Berkeley Street and SB I-5 Ramps	1431	1327	1515	1531
3	Berkeley Street and NB I-5 Ramps	2133	2207	2365	2349
4	Thorne Lane and Union Avenue	881	707	820	967
5	Thorne Lane and SB I-5 Ramps	1442	1212	1260	1256
6	Thorne Lane and NB I-5 Ramps	1841	1693	1680	1674
7	Barksdale Avenue and Steilacoom	1741	1491	N/A	N/A
8	Barksdale Avenue and SB I-5 Ramps	2023	1735	N/A	N/A
9	Barksdale Avenue and NB I-5 Ramps	1682	1474	N/A	N/A
10	41st Division Drive at I-5 SB Ramps	2821	1881	N/A	N/A
11	41st Division Drive at I-5 NB Ramps	2875	2072	N/A	N/A

5. Peak Hour Selection

Berkeley Street connects to both Joint Base Lewis-McChord (JBLM) and Camp Murray. During the early morning, left turning traffic from the I-5 SB off ramp is the highest during any period of the day. During the Lunch/NN Peak and PM peak, traffic coming out of both military bases is higher than at other peaks. The intersection at Berkeley Street and Union Street usually has congestion during Lunch/NN Peak and PM peak. PM peak hour volumes are similar to those during Lunch/NN peak hour. **For Berkeley Street, we recommend that the analyzing the Early AM peak hour and PM peak hour for existing and future condition modeling at Berkeley Street.** Based on the volumes and field observations, we believe these analysis periods will capture the most congested times at the ramp terminals while also capturing the congestion (and the times at which there would be the most conflicting movements) at the Berkeley/Union intersection.

North Thorne Lane connects to 150th Street as an east-west corridor and it also serves as an alternative route to access both JBLM and Camp Murray. It is also a popular route during the lunch peak period. Regular AM peak hour volumes are generally higher than those during early AM peak hour. PM peak hour volumes are higher than those during Lunch/NN peak hour except one movement from the northbound

right turn at Union Avenue. **For North Thorne Lane, we recommend analyzing the Regular AM peak hour and PM peak hour for existing and future condition modeling.** We believe this will capture the most congested time periods at the ramp terminals. The intersection at North Thorne and Union experiences its highest overall volumes during the PM peak, and also has high volumes of conflicting movements during the PM peak.

41st Division Drive has access gates for JBLM on both sides of Interstate-5 (I-5). During the early morning, left turning traffic from the I-5 SB off ramp is the highest during any period of the day. PM peak hour volumes are generally higher than those during Lunch/NN peak hour. **For 41st Division Drive, we recommend analyzing the Early AM peak hour and PM peak hour for existing and future condition modeling.**

Barksdale Avenue has access/gates to JBLM on the east side of I-5.. There is also an access road to JBLM on the west side of I-5, along DuPont-Steilacoom Road. 2010 traffic patterns show that Early AM peak hour volumes are generally higher than those during Regular AM peak hour and PM peak hour volumes are higher than those during Lunch/NN peak hour except one movement from northbound right turn movement at DuPont-Steilacoom Road. **For Barksdale Avenue, we recommend analyzing the Early AM peak hour and PM peak hour for existing and future condition modeling.**

Table 5 summarizes recommended peak hours for existing and future condition modeling for each area/crossing. “X” symbols represent the recommended periods.

Table 5 Selected Peak Hours

Crossings	Peak Hours			
	Early AM Peak Hour	Regular AM Peak Hour	Lunch/NN Peak Hour	PM Peak Hour
Berkeley Street	X	-	-	X
Thorne Lane	-	X	-	X
41st Division Drive	X	-	-	X
Barksdale Avenue	X	-	-	X